Claims

1. A method for controlling a pick-up for reading three
    or more data streams from a storage medium, the data
    streams being used for simultaneous reproduction and
    belonging to different data types with different
    constant or variable data rates, and the data streams
    being distributed to more than one file on said
    storage medium and being separately buffered after
    reading, with the amount of buffered data relating to
    any of said data streams being at least such that
    subsequent processing can be provided with the
    buffered data during the time required for accessing
    and reading the other data streams of the other data
    types, the method comprising:

    - buffering (B_{video}) a first data stream of a first
      data type, the data stream having the highest
      buffer output data rate of all said three or more
      buffered data streams; and

    - accessing the data streams by the pick-up according
      to a predefined temporal scheme, the scheme being
      such that, after an initialization, for any three
      successively read data streams, wherein the second
      is another than said first data stream, the first
      and last data stream is said first data stream.

2. Method according to claim 1, wherein the pick-up is
    an optical pick-up and the data streams comprise a
    video data stream, an audio data stream and a
    subtitle data stream.

3. Method according to claim 1 or 2, wherein said first
    data stream is read periodically from the storage

medium in periods of a first period time (T), and the other data streams are read from the storage medium in periods of integer multiples of said period time $(n \cdot T, k \cdot n \cdot T)$.

4. Method according to claim 3, wherein each of said periods for reading the other buffers is individual, such that the period for reading of a data stream from the storage medium is the shorter, the higher the buffer output data rate of the data stream is.

5. Method according to any of the previous claims, wherein the predefined temporal scheme is further specified such that if the second of any three successively read data streams (1SP,2SP) is said first data stream, then the first or the third read data stream is also said first data stream.

6. Method according to any of the previous claims, wherein an interrupt request may interrupt the scheme, and after serving the interrupt request the same scheme as before is continued, wherein said continuing of the same scheme is achieved by loading one or more buffers only partially, to the level the buffer or buffers would have in the scheme at that time $(T_{d,a}, T_{d,v})$ if the scheme had been continued without interruption.

7. Method according to any of the previous claims, wherein the start-up procedure comprises buffering an individual initial amount of data from each data stream, the initial amount of buffered data from each data stream corresponding to the position (S^*) within

the scheme where the total amount of buffered data is minimal.

8. Method according to any of the previous claims, wherein additional data from other streams than said first data stream are buffered (B_{audio}, B_{sub}), the additionally buffered data leading to an additional time (t_d) during which these additional data are output from the buffer, the additional buffer output time (t_d) being shorter than said period (T).

9. Method according to any of the previous claims, wherein additional data from said first data stream is buffered (B_{video}), the additionally buffered data leading to an additional time (T_j+T_{GOP}) during which these additional data are output from the buffer, the additional time (T_j+T_{GOP}) being shorter than said period (T), wherein T_j corresponds to the period when the scheduler interrupts the pick-up reading of a current video stream and moves to another stream that contains the video data for a requested angle, and T_{GOP} corresponds to a duration of a data unit that is sufficient for decoding.

10. Apparatus for reading three or more data streams for simultaneous reproduction from a storage medium, the data streams belonging to different data types with different constant or variable data rates, and the data streams being distributed to more than one file on said storage medium and being separately buffered after reading, with the amount of buffered data relating to any of said data streams being at least such that subsequent processing can be provided with

the buffered data during the time required for accessing and reading the other data streams of the other data types, the apparatus comprising:

- means for buffering (B_{video}) a first data stream of a first data type, the data stream having the highest buffer output data rate of all said buffered data streams; and

- means for controlling a pick-up for reading the data streams, wherein the pick-up reads the data streams according to a scheme, the scheme being such that, after an initialization, for any three successively read data streams, wherein the second is another than said first data stream, the first and last data stream is said first data stream.